codex™

ARRIRAW RECORDER

GETTING STARTED GUIDE

ARRI
CERTIFIED FOR
ARRIRAW
T-LINK
ALEXA

codex ARRIRAW RECORDER

SETTING THE STANDARD FOR ARRIRAW WORKFLOWS, THE CODEX ARRIRAW RECORDER IS CERTIFIED TO CAPTURE THE UNCOMPRESSED T-LINK OUTPUT FROM THE ARRI ALEXA AND D-21 DIGITAL CINEMA CAMERAS.

THE ARRIRAW RECORDER STORES BAYER IMAGE DATA, PLUS AUDIO AND METADATA, NATIVELY AS THE "DIGITAL CAMERA NEGATIVE" ON A SINGLE, REMOVABLE DATAPACK. WHEN SHOOTING IS DONE, A CODEX TRANSFER STATION CAN BE USED TO OFFLOAD MATERIAL MUCH FASTER THAN REAL-TIME.

Licencing

The Codex ARRIRAW Recorder is licensed to record ARRIRAW only, and may be licensed for recording either one or two cameras. To extend the licence to allow for recording of additional video formats and dual camera recording capability, please contact licence@codexdigital.com

GETTING STARTED

Power Up and Shutdown

The power input for the ARRIRAW Recorder auto-switches between two voltage ranges. See back of this guide for details. Once all necessary cabling is correctly connected, press the **Power Button** on the top surface of the recorder. When it has started and a Datapack with a Roll is loaded it will switch into live mode and the LED ring will become orange.

The battery meter on the display shows minutes remaining and a capacity remaining percentage for smart batteries, or else just a voltage reading. If the Shutdown voltage setting in the System menu has been set too high for your battery, then you may not be able to start up normally. In this case, boot the recorder in safe mode by pressing a thin implement, such as a paperclip, through the hole in the top surface, whilst pressing the power button. This will reset the Shutdown voltage setting to default, and you will be able to boot normally after this.

To power down press the **Power Button** on the top of the recorder and then press the **Shutdown** button which appears on the Control Panel. The shutdown process is complete when all lights on the recorder have switched off.

Loading and unloading a Datapack

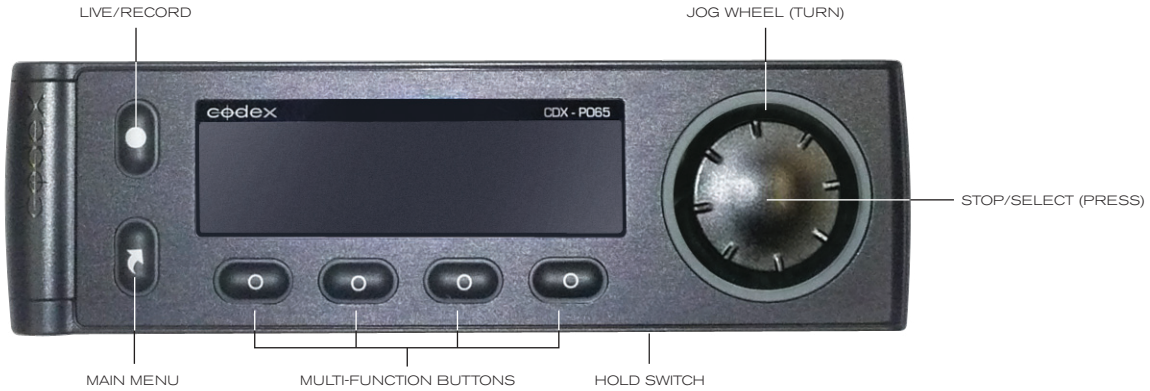
The Datapack should find a natural position when rested on the recorder due to the interlocking design of the loading mechanism. Take care that the Datapack is mated flat with the recorder before closing the locking mechanism. Turn the locking lever 180 degrees clockwise to lock the Datapack to the recorder. When unloading the Datapack, unlock the lever by approximately 20 degrees to the first position. Wait until the LED on the Datapack becomes solid red and then fully unlock the lever.
(**WARNING - damage may occur to the Datapack drives if they are disconnected without waiting**)

Roll and shot concepts

There must be a Roll on a Datapack in order to make a recording. See section on the **Storage** screen for information on how to create a Roll.
A shot is created after each record-stop cycle of operations. Multiple shots can be recorded onto a Roll, and once shots have been recorded they can be transferred between Datapacks (using a Codex Transfer Station) and will maintain the original Roll name in their metadata. For dual camera recording the recorder can record shots with two video channels, identified by default Channel IDs of V1 and V2 (which are user definable). When processed out by a Codex Transfer Station the shots from each camera are then output as separate files with metadata allowing them to be organised correctly for post production. For independent dual camera recording refer to the Remote User Interface section of this guide.

THE CONTROL PANEL AND MENU SYSTEM

There are a few global rules about how the Control Panel operates, which will be dealt with before menu specifics:



1) You are only ever two button presses from recording: if you are anywhere in the menu system then one press of the **Live/Rec** button will engage live mode, and a second press will begin a recording. If you are already in live mode then a single press will begin a recording. During recording the only responsive button is **STOP/SELECT** which finishes the recording and puts the recorder back into live mode.
2) The colour of the LED ring on the Control Panel (and on the top surface of the recorder) shows the current mode of the recorder.
   The different modes are: Live = **Orange**; Recording = **Red**; Playing = **Green**; Pause/Setup = **Blue**.
3) When the **Hold Switch** is on there will be a padlock symbol at the top of the screen, and none of the other buttons will respond until the **Hold Switch** is set to be off. The image below shows the screen with the padlock symbol:

4) This image also shows another global function – from any screen the Main Menu button can be pressed which brings up the | **Play** | **Setup** | **Storage** | options on the **Multi-Function** buttons. This can be used at any time to navigate to these screens.
5) From within the menus the left **Multi-Function** button can be used to go **Back** a level or to **Monitor** (Live) mode.
6) The **Jog Wheel** can be turned to navigate through lists in the menu.
7) The **Select** button is used to select from a list, whether it be a settings list or a shot list.
8) If there are less than 3 possible settings for a menu option these will be available on the **Multi-Function** buttons below the screen. If there are more than 3 options the **Select** button can be used to open a list of all possible settings.
9) Some menu fields, such as the **Shot Naming Rule**, contain presets which are indicated by < and > symbols. On the **Multi-Function** buttons press the **Next** button to move through presets, **Accept** to use a preset, or **Cancel** to leave the settings as they are.
10) Pressing **Select** on a text field (e.g. a metadata field in the shot Filecard) will open the text editor screen. Initially the Jog Wheel controls the position of the cursor. Backspace deletes characters from where the cursor is located. Press **Insert** to bring up the row of characters that can be navigated using the Jog Wheel, and press Select to enter a character. The **Shift** button can be pressed to cycle the character row through Shift, Caps, and Normal case modes. Exit Insert mode by pressing the **Cursor** button.
11) The battery level is always shown in the top left corner of the display.
12) The record time remaining is always shown in the top right corner of the display. If this symbol is flashing then it indicates either that there is less than 5 minutes of record time remaining, or that there is an issue with the Roll on the Datapack which should be checked from the **Storage** screen.

The most important screens of the Control Panel display are:

Live/Rec

The video format is shown at the top of the screen as follows: <Video format> <Frame rate> <Storage format>
Below the battery symbol is the shot name. In live mode this is the name of the next shot to be recorded, and in recording mode it is the name of the shot currently being recorded. Below this is the main timecode display, and to the right of this are the audio meters. Any warning or error messages appear below the timecode display. Warnings are cleared from the display if the cause for the warning is corrected. The **Next Scene** button increments the scene number by 1 and resets the take number to 1. The **Review** button plays back the last 10 seconds of the previous recording.

Options

These options can be used to change the playback behaviour as well as the type of timecode display. ARRIRAW shots can be forced to play at 23.98, 24, 25, 29.97, or 30 fps. A 1D LUT can be selected from here to be applied to the video outputs. See the LUTs section of this guide for further details.

Filecard

The Filecard is where shot metadata can be viewed and edited. This can be accessed in live mode in order to prepare the metadata (e.g. Scene and Take values) for the next shot, or in play mode for any previous recordings. When a change has been made it is not automatically stored. Press **Accept** to save any changes, or press **Cancel** to lose them. Use the **Clear** button to wipe the contents of a field without having to use the text editor.
The **Format** button shows the full format information for the shot.

Play

Going to the **Play** screen will load the last recorded shot. To load another shot press the **Shots** button which will bring up the **Shot List.**
Use the → button to play the shot forwards, and the ← button to play the shot backwards. The Jog Wheel can be used to jog through the shot.

Shot List

Use this screen to **Select** a shot for playback, open the Filecard of a recorded shot to view/edit metadata, or delete recorded shots. Deleting shots is a non-reversible operation. From left to right, the columns on this page show:
<Shot Name> <Start Timecode> <Shot Duration>

Storage

This screen shows information about the Datapack, drives, and Roll. When creating a Roll turn the Jog Wheel left for RAID-0 (no parity) and right for RAID-1 (mirrored drive set). To create a Roll on a blank Datapack press the **Create** button and use the text editor to enter a Roll name (max. 8 characters). The drives should all be listed as **'Good'** and the Status as **'Ready'**. If this is not the case then contact Codex Support. **Delete** can be used to delete a Roll and all the shots on it. This is a non-reversible operation. **Remote** mode allows for another Codex machine to access the material loaded on the recorder via Ethernet connection. For ARRI Alexa 2880x1620p, RAID-0 allows single camera ARRIRAW up to 30fps and dual camera ARRIRAW up to 25fps. RAID-1 allows single camera ARRIRAW up to 25fps.

Setup

Menus in the Setup screen are as follows:
Project – enter metadata for the project such as Project Name, Director, DoP, Unit, etc. This information is stored as metadata with all shots.
Source – set unique information for sources, such as **Source Name** and **Source ID** value. When using ARRI Alexa the Source Name should be set to **'ARRI Alexa'** in order that the **White Balance** and **Exposure Index** values are used correctly when creating deliverables. If the Source Name field is left blank for ARRIRAW recordings then the system will presume the material was shot on ARRI D-21. Source ID is commonly used in Roll and Shot names to differentiate between different cameras.
Slate – set the **Shot Naming Rule** and **Roll Naming Rule.** These use metadata to automatically generate shot names and roll names for recorded shots. There are several useful presets which include settings to use the shot and reel names sent in the data stream by the ARRI Alexa.
Channels – set this to 1 for single camera recording or 2 for dual camera recording.

Video – Select the appropriate settings for the camera output being received by the recorder. For shooting normal framerates Variframe mode should be **Off.** For offspeed framerates Variframe mode should be **On.** If Variframe in enabled on the recorder but not on the camera then no frames will be recorded. Check that the timecode display progresses during recording to confirm that frames are being recorded. It is also recommended to use the **Review** function as confirmation of successful Variframe recording.

Quality is always 1:1 (uncompressed) for ARRIRAW recording.

Input has two options: ○ Default – this should be used for ARRIRAW recording. ○ 3G – at the time of writing 3G ARRIRAW is not available from the camera

Output – The 4:2:2 setting should be used in most cases. The ARRIRAW Recorder provides a debayered output at half resolution as a 'gate check'. For two camera recording, in live mode there is a 4:2:2 output for each camera. For playback, **Output 1** switches between showing the first camera and the second camera each time **Stop** is pressed during playback.

GPI – It is possible to start/stop the recorder using the Alexa's **RUN** button (formatted SxS media must be inserted in the camera to use this feature). Set **Record Trigger** to **SDI** if you wish to synchronise with SxS recording, to **GPI** if you wish to use a custom electrical trigger (e.g. Preston control), or **None** if you intend to use the RECORD/STOP buttons on the recorder to start/stop recording.

Audio – Depending on the Input setting, the ARRIRAW Recorder can record between 2 and 8 channels of audio. Select the appropriate input type and bit-depth. If using AES audio and the signal is not frequency locked to the video then set **AES SRC** option to **On.** No audio is recorded when Variframe is On.

Timecode – Select the appropriate timecode setting. If using HD VANC timecode from ARRI Alexa then **Fix TC Breaks** should be set to **No**. This is critical for correct timecode handling when shooting in Variframe mode.

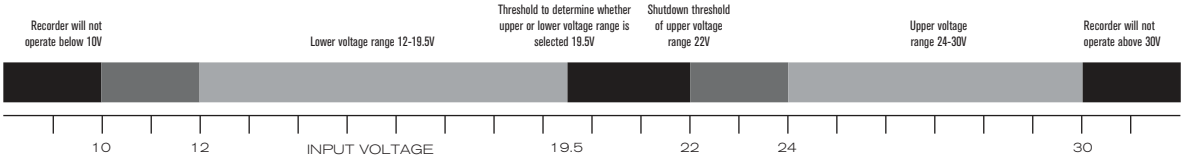
LUTS

The ARRIRAW Recorder can apply 1D LUTs in ASSIMILATE SCRATCH format to the video outputs for monitoring and playback. To load a LUT, connect via the network port to the /codexsettings samba share with user=codex, password=codex. Place any LUT files you want to use in the /luts directory. From the Control Panel select **Options** when in live or play mode and from this sub-menu select LUT. You can enable/disable any LUT on the system from here.

REMOTE USER INTERFACE

There are several reasons why the ARRIRAW Recorder may need to be controlled from a remote User Interface (UI), running on a networked computer. For instance, setup and operation for independent Dual Camera recording must be done from a remote UI. If the recorder is on a crane with the camera then this may be a preferable way to operate it. The remote UI software is available for both Windows and Mac, and can be downloaded from www.codexdigital.com/software. Once it is installed, ensure the IP address of the recorder and the remote computer are in the same range, i.e. if the recorder IP is 192.168.1.110 and the subnet is 255.255.255.0 then the remote computer should have an IP which begins 192.168.1. and the last number of it's IP should be any number between 1 and 254, except for 110. The remote computer should also have a subnet of 255.255.255.0. Use the **SYSTEM** menu within **SETUP** on the recorder to change network settings. With correct network settings and an ethernet cable attaching the recorder to the remote computer, run the Codex software package and enter the recorder IP address in the box which appears. Initially you will not be **'IN CONTROL'**, which means you can edit shot metadata but not control the functions of the recorder. Go to the **SETUP** tab, then the **CONTROL** screen, and you can press **'TAKE CONTROL'** in order to control all settings and functions of the recorder.

VOLTAGE RANGES



ERROR/WARNING MESSAGES

Warning/Error Message	Meaning	Course of action
No video input signal detected	No video/valid input signal detected by the video card. The video signal could be absent, too weak, or could be in a format which the recorder does not accept.	Check cabling between the video source and the recorder. Check the video output format of the source. If this happens during monitoring it is recommended to switch to playback mode and then back to monitoring to 're-time' the recorder to the incoming video signal.
Video CRC error	One or more errors have been detected on the incoming video signal. This will be evidenced by visible errors appearing as 'sparkles' on the recorded data.	Check cabling – it could be damaged, too long, or suffering interference from lighting etc.
Video frame dropped	There has been a momentary loss in video signal, or data has failed to be written to disk.	This can occur if signals are dropping in and out during monitoring, so it is advised to restart monitoring after a signal drop to re-time the recorder to the incoming signal. If this happens during recording on one channel it is likely the result of cabling problems. If it happens during recording on both channels then it could be a symptom of a Datapack write-speed problem, in which case you should contact Codex Support.
Input video signal wrong type	Video Format is set to a different format from the one being supplied.	Check the Video Format settings and make the appropriate changes.
No AES audio input detected	Audio Source is set to AES but there is no AES audio signal being received at the AES inputs on the back panel.	Check that the audio being supplied is an AES/EBU signal at 16-bit, 48KHz.
No embedded audio input detected	Audio Source is set to HD AIV, but there is no embedded audio being received by the HD IN connectors on the back panel.	Check that the source is set to output embedded audio.
No video input signal B detected	The ARRIRAW T-LINK signal is transmitted via dual HD-SDI, and there is no second link detected.	Check cabling is connected and not faulty.
Not all embedded audio inputs detected	Audio Channels is set to expect more HD AIV audio channels than are being supplied.	Check the source is outputting the correct number of audio channels.
Not all AES audio inputs detected	Audio Channels is set to expect more AES audio channels than are being supplied.	Check the source is outputting the correct number of audio channels.
Timecode break	This will most likely be caused by a discontinuity in the timecode, which in turn is caused by the timecode and video not being locked together.	Check video and timecode source genlock.
Video cables misconnected	Cables are connected to video inputs in the wrong order.	Check and correct the input cables.
Roll is full	There is no more space on the Datapack Roll.	Switch to a different Datapack which has storage space remaining.
Input signal is black	ARRIRAW only - the Alexa is generating a black signal on REC OUT.	Reboot the Alexa.
No valid frames - check variframe settings	Variframe is enabled but no Variflag frames are received after a few seconds.	If intending to shoot variframe, confirm Recording -> REC OUT -> Variflag setting on Alexa.
Cannot play shot	The Datapack is not good or degraded in some way. If this is the case the record time remaining symbol will flash to indicate an issue.	Contact Codex Support to determine the best course of action.
Invalid video format for Datapack	The format settings are not compatible with the loaded Datapack.	Either change format settings to be compatible, or change Datapack. The most common cause is a lack of disk bandwidth, so either select a format with lower bandwidth or use a Datapack with more drives.

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